YOU'LL WANT RUNNING WATER AND PLUMBING ON YOUR FARM TOO.

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Your electricity offers you an opportunity to have running water and a complete plumbing system that you have never had before. It eliminates the need for large expensive storage tanks that are necessary with gasoline engine, windmill, or hand operated systems, and it also eliminates the need for close constant attention. It eliminates the heavy labor required by hand pumping. If your water and plumbing system is properly installed, it gives you water, convenience, and sanitation when and where you need it.

Consider the uses and needs for water and plumbing about your farm. You will want your water system to supply all of the uses for which you are now using water and, in addition, you may want it to furnish water for other purposes such as a water closet in the new bathroom, lawn sprinkling, garden watering. You will also likely want to use water in new locations. For example, you may want water for washing clothes in the basement instead of in the kitchen, or you may want water for your dairy cows at individual drinking cups in the stable instead of at a trough in the barnyard. Think of these uses in terms of your future needs even if you do not plan to put in the complete system at first. Planning for the future will make it possible for you to put in the first parts of your system so that they can later be added to instead of torn out and replaced.

Plan the location of the bathroom in your house. Can an existing room be used, or will it be necessary to build an addition? How about a separate shower bath for farm workers? Where should the septic tank and the septic tank disposal field be located?

How about your well? Will it supply all of the water that you need or will you have to improve it or drill a new one? A well that does not supply enough water for a hand pump will be even less adequate with an electric water system. If you are now using two or three wells, will one of them be adequate for all needs or will you have to install water systems on more than one of them?

Is your well protected from contamination? It is not good business to put a modern up-to-date water system in a contaminated water supply or in one that is likely to be contaminated. Consult your local health authorities or your County Agricultural Agent on proper protection for your well both from surface sources and from subsurface seepage.

Type of Pump to Buy

Your pump must be designed to fit your well. If you have a shallow well you should buy a shallow well pump. If you have a deep well you must buy a deep well pump.

It is the depth to the water when the pump is running that determines whether you have a shallow well or a deep well. The following table gives this depth for different elevations above sea level:

Elevation above sea level	Maximum depth to water for shallow well pump (feet)
Sea level	22
1/4 mile (1,320 feet)	21
1/2 mile (2,640 feet)	20
3/4 mile (3,960 feet)	18
1 mile (5,280 feet)	17
1-1/4 miles(6,600 feet)	16
1-1/2 miles(7,920 feet)	15
2 miles(10,560 feet)	14

Different manufactureres make many different styles of pumps. You will find that each of these is described as either a shallow well pump or a deep well pump. Only the deep well jet type is suitable for use in both shallow wells and deep wells. Jet pumps should not ordinarily be used in wells where it is more than 80 feet to water. They will operate where the depths to water are much greater than 80 feet but their efficiency decreases so fast with increased depth that it is usually more economical, with greater depths, to use cylinder type deep well pumps.

The Type of Water Storage Tank to Use

You will need a water storage tank with your pump. Some pumps are sold for use without storage tanks but they are best suited for use at summer cottages and other places where the use of water is very limited. The storage tank prevents the pump from starting and stopping every time a little water is used, and from stopping and starting frequently while water is being drawn slowly. It reduces wear on the pump and motor and decreases the amount of electricity used.

The water storage tanks used with gasoline engine or windmill driven pumps are often large elevated tanks on towers, on hills, or in the upper parts of buildings. Such tanks may be used with electric systems but are not needed. For your electric pumping system you will probably want a hydropneumatic tank of about 42 gallons or 80 gallons capacity. A 42-gallon tank will allow you to use about eight gallons of water between the time when the pump automatically stops and the time when it automatically starts again. An 80 gallon tank will let you use about 16 gallons of water between each stop and start of the pump. If you have a very large dairy herd or if you plan to water a garden larger than 1/4 acre, it would be desirable for you to use a 120-gallon tank. A tank of this size would supply about 25 gallons of water between each stop and start of the pump.

Remember that the main purpose of the water storage tank in an automatic electric water system is to "cushion" the action of the pump. Since the pump starts and stops automatically, it is not necessary to have a large reserve of water in storage unless your well will not furnish water as fast as you need it.

The Size of The Pump You Need

One of the advantages of an electric water system is that it provides you with the water you need when you need it. Don't limit its usefulness by putting in too small a pump. An ordinary 3/4-inch garden hose will handle water at a rate of about 300 gallons per hour. The 5/8-inch size will handle about 200 gallons per hour. If your water system is to give you any real assistance in fighting a fire, you will want to be able to use at least one 3/4-inch garden hose to its full capacity. This means that you will want a pump that will give you at least 300 gallons per hour.

Everyone uses more water when it is easily available than when it must be pumped by hand. So you need to plan for this increased use. It has been found that many people with automatic water systems use about the amount of water shown in the table below.

Common Farm Water Requirements From An Electric Water System

Use	Amount
Each member of family	35 gallons per day
Each milking cow	35 gallons per day
Each horse, dry cow, or beef cow	12 gallons per day
Each hog	3 gallons per day
Each sheep	2 gallons per day
Each 100 chickens	3 gallons per day

This table will give you a basis for estimating the amount of water that your water pump will be called upon to furnish on your farm. Your use of this water will not be evenly distributed throughout the day, so your pump will be called on to deliver most of this water in a few short periods of time during the day. Your pump should be of a size that will furnish the water needed in a day by 2 hours or less actual pumping. If your well will not furnish water this fast, you should put in a pump adapted to your well and then provide enough water storage so that two hours of pumping plus the "active" storage capacity will equal your daily need.

Locating Your Pump

If you are putting in a deep well cylinder type pump you will have to place it on the well curbing directly over the well. This will likely require that you build a pump house over the well to protect the machinery. If you are putting in a shallow well pump or a deep well jet pump you

can place it in any convenient location within the suction limits of the pump so long as the pipe slopes continuously upward from the water in the well to the pump. This means that you may be able to place your pump in the basement of your house, in your woodshed, or in some other protected location and thus avoid building a separate shelter for its protection.

Laying Out Your Water Service Piping

Your water service piping is the pipes in your system which carry the water from your water storage tank to the distribution pipes in the various buildings. These pipes should be laid with as few elbows as possible and so that they can be completely drained at one end or the other. They should be large enough to deliver the full capacity of your pump at all main buildings with not more than five pounds per square inch pressure loss between the storage tank and the building. Chart I will show you the size pipe that you will need to each of your buildings.

CHART I

SIZE OF PIPE NEEDED FROM PUMP TO BUILDINGS FOR NOT MORE THAN 5 POUNDS PRESSURE LOSS IN THE PIPE

Capacity of pump in gallons per hour	Length of Pipe											
	50 ft or less	75 ft	100 ft	150 ft	200 ft	300 ft	400 ft	500 ft	600 ft	700 ft	800 ft	900 ft	1000 ft
100	½" pipe												
125													
150													
175		3/4" pipe						1" pipe					
200													
225													
250													
275											1-1/4" pipe		
300													
325													
350													
375													
400													
425													
450													
475		1" pipe				1-1/4" pipe							
500													
525													
550										1-1/2" pipe			
575													
600													
625													
650											2" pipe		

This example will show you how to use Chart I. Suppose your pump has a capacity of 350 gallons per hour and there are 200 feet of pipe from your water storage tank to your barn. In the left column headed "Capacity of pump in gallons per hour", about half way down, you find the figure "350". Follow straight across the page to the right from "350" until you are in the column directly under 200 feet. You will notice that you are now in a part of the chart labeled "1 inch pipe." This means that, in this situation, 1 inch pipe would be the correct size from the storage tank to the barn.

The pipe between your buildings, or between your storage tank and the buildings, should be as short and as straight as is practical. Elbows in the pipe have the same effect on the flow of water as a longer pipe. You may find it best to run a pipe straight from your storage tank at or near your house to your barn and to take branches off of this pipe to the poultry house, the hog house, the farm shop, and other buildings at the points where it comes nearest to these buildings. If any of the buildings in which you want water are beyond the barn, the main water line through the barn to them should be as straight and as short as it is practical to make it.

Planning the Water Distribution Piping in Your House

If your water storage tank is outside of your house, your water distribution piping in the house is a continuation of the water service piping leading to the house. If the storage tank is in the house, the distribution piping begins at the bank.

Both copper tubing and steel pipe are used for this purpose. Steel pipe is cheaper than copper tubing of the same size. However, it cannot be bent around corners like copper tubing and thus requires more labor to put it in. Sometimes this additional labor cost offsets the saving in the cost of materials. In most cases, the copper pipe is more durable. Either type can make a satisfactory installation.

The distribution piping branches so that water is carried to all places where water is to be drawn from the system. It may pass through a water softener if one is installed. One branch leads to the water heater and then from the heater it branches to the various places where hot water is to be drawn from the system.

It will be necessary for you to determine where you are going to want both hot and cold water if the distribution piping is put in to furnish it properly. The following table shows places where many farmers want it:

Common Farm Household Uses of Hot and Cold Water

Cold Water	Hot Water
Kitchen Sink	Kitchen Sink
Bathroom Lavatory	Bathroom Lavatory
Bathroom Water Closet	Bathroom Bath Tub

Cold Water	Hot Water
Bathroom Bath Tub	Bathroom Shower Bath
Bathroom Shower Bath	Back Porch Lavatory or Sink
Back Porch Lavatory or Sink	Laundry Tubs
Laundry Tubs	Washing Machine
Washing Machine	Farm Workers' Shower Bath
Farm Workers' Shower Bath	
Lawn Watering	

Charts II and III show the sizes of steel pipe or copper tubing that you will need.

CHART II

SIZE OF STEEL PIPE NEEDED IN THE HOUSE TO SERVE DIFFERENT NUMBERS OF FAUCETS

Number of faucets served by pipe	Length of Pipe												
	10 ft	15 ft	20 ft	25 ft	30 ft	35 ft	40 ft	45 ft	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft
1	1/2" pipe					3/4" pipe								
2	3/4" pipe													
3 or more										1" pipe				

CHART III

SIZE OF COPPER TUBING NEEDED IN THE HOUSE TO SERVE DIFFERENT NUMBERS OF FAUCETS

Number of faucets served by tubing	Length of Tubing												
	10 ft	15 ft	20 ft	25 ft	30 ft	35 ft	40 ft	45 ft	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft
1	3/8" tubing							1/2" tubing						
2	1/2" tubing						3/4" tubing							
3 or more													1" tubing	

This example will show you how to use Charts II and III: Suppose the length of pipe from the place where your water service pipe enters the house to the most distant faucet, which may be in the bathroom on the second floor, is 30 feet; the first 10 feet carries water for 9 faucets; the next 12 feet carries water for 3 faucets; and the last 8 feet for 1 faucet. Steel pipe is to be used. Since the greatest length of pipe is 30 feet, you find the column headed "30 feet" in the chart for steel pipe. Go down this column until you are directly opposite the number of faucets to be served by each section of the pipe, as indicated in the column at the left of the chart. You will notice that for both the first section of 10 feet of pipe and for the second section of 12 feet of pipe you are in a part of the chart labeled "3/4 inch pipe." For the third section of 8 feet of pipe you are in a part of the chart labeled "1/2 inch pipe." This means that, in this situation, the first 22 feet of the pipe should be 3/4 inch size and the last 8 feet should be 1/2 inch size. If copper tubing were being used instead of steel pipe, you would use the chart for copper tubing in the same way.

Planning the Water Distribution Piping in Your Farm Buildings

You will want water in several of your buildings other than your house. In some buildings such as your shop, your machine shed, your hog house or your chicken house, one faucet or hydrant may be enough. In buildings such as your dairy stable or your milk house, you may need several faucets. It is a good practice to continue pipe the same size as your water service pipe to one faucet with a hose connection in each building. This will make it possible for you to use a hose to its full capacity for fire fighting, cleaning, and similar uses. Half inch steel pipe or copper tubing will likely be adequate for the distribution piping to other faucets unless there are several that may be open at once or the pipes are more than 50 feet long. Then it would be best to use 3/4 inch pipe or tubing.

In all buildings where there is danger of the pipe freezing, you should install some means of draining the distribution pipes, such as a frost proof valve between the service pipe and the distribution pipes. The frost proof valve may be buried in the ground where your pipe enters the building and will allow all of the water in the distribution pipes to drain into the ground when it is closed by a handle extending above the ground.

The Sink for Your Kitchen

The sink is a very important part of your kitchen--the workroom of your home. Since the location and installation of the sink are permanent, you should plan for complete modernization of your kitchen and install the sink so it will fit in this plan. This modernization plan would include workshelves and cupboards as well as the arrangement of furniture and fixtures. Such a plan can save a quarter-mile of walking a day in doing the housework, and having running water in the kitchen can eliminate carrying 300 or more tons of water a year into the house.

The washboard sink is the type most common on farms today. It is built into a cupboard level with the working space on each side of it.

The wall hung sink is more expensive and has an enameled splash back. It is attached to the wall but may be placed level with the work space on either side of it.

Both single basin and twin basin sinks are available. The twin basin ones are more expensive but are usually worth the difference in cost.

Many women prefer sinks without attached drainboards. Too many dishes are broken on the hard porcelain drainboards.

You will want an acid-resisting finish on your sink so that it will not stain readily.

Planning Your Bathroom

You will want a water closet, a lavatory, and a bath tub or shower bath in your bathroom. In addition, you will want a medicine closet with a mirror on the door over your lavatory, towel racks convenient to both the lavatory and the bath, a soap dish by the bath, a light over or on both sides of the mirror, and an electrical outlet for your electric shaver, curling iron, and portable heater. This outlet may be in the mirror light fixture.

A room with a floor space about 5 by 6 feet would be excellent for your bathroom, although you can use almost any space at least $4\frac{1}{2}$ feet wide with a floor area of $22\frac{1}{2}$ square feet. This will provide for a shower bath. A bath tub can be used if there is 25 square feet of floor and the door swings outward. At least 30 square feet is needed if there is a bath tub and the door swings inward.

If it is at all practical, you should have a window in your bathroom for ventilation.

If your bathroom is located so that your water closet is next to the outside wall of your house nearest your septic tank, the amount of the expensive waste piping required by your water closet will be least.

Water supply pipes are most likely to freeze if they are in an outside wall. An arrangement of your fixtures which keeps these pipes out of outside walls will reduce this danger.

Selecting Your Water Closet

Common water closets are much alike. The complete unit includes a vitreous china bowl with hardwood seat and a vitreous china flush tank. It occupies a floor space about 24 by 40 inches. However, you will be able to make several choices. Some water closets have the tank hung on the wall and connected to the bowl by a chromium plate pipe, others

have the tank and bowl bolted together so that no wall fastening is used.

There are three general types of water closet bowls. The washdown is the cheapest. It has the trap in the front, and the smallest area of water surface. It may have a jet to assist the siphon action of the trap. The reverse trap type is similar to the washdown type except that the trap is placed at the rear allowing an elongated rim, larger water surface, and deeper water seal. It may have a jet to assist the siphon action of the trap, and is quieter in operation than the washdown type. The siphon jet type has the trap at the rear and is similar to the reverse trap type with a jet except that the water passages are larger and the flushing action depends mainly on the jet instead of the siphon. It has the largest water seal, the largest water surface and the quietest action. It is also the most expensive. You can get good service from any of the three types and the choice will depend largely on the amount of money you are willing to spend for easier cleaning and quieter action.

Selecting Your Lavatory

Common lavatories are made both of vitreous china and regular or acid-resisting enameled cast iron or steel. The china ones are usually more expensive. As a rule, your lavatory will occupy about 18 or 20 inches of floor space. You may get either an oval or a hexagonal-- the oval one being somewhat easier to clean.

If you place your lavatory close to the corner of the room, you should allow at least three inches of space along the side for cleaning the wall.

Selecting Your Bath Tub or Shower

Whether you install a bath tub or a shower is entirely a matter of personal choice if you have the space for either since the cost of the two is about the same. You may have a combination tub and shower by adding a shower head and curtain rod with a curtain to the tub.

Most tubs are made of enameled cast iron although some of the more expensive ones are glazed earthenware. Before you install an earthenware one be sure you determine that your floor will support its weight without sagging.

You may choose a leg type, a universal type which you may enclose with inexpensive waterproof wallboard to match the walls of the room, or an apron type. You will probably find it best to avoid the leg type as it involves a lot of tiresome work cleaning under and behind it. The apron type is most expensive but does not require enclosing as it has a skirt extending to the floor.

The lengths of tubs vary from about 4½ to 6 feet. You will be better satisfied with one at least 5 feet long.

Regardless of the type of tub you select, the spout should be of the overrin type to eliminate the possibility of water from the tub ever being siphoned back into the water pipes and contaminating the water supply.

A shower compartment will take about half as much floor space as a tub. You can get it with walls of a variety of materials although sheet steel walls are most common. The base is usually steel, concrete, or cement composition.

Selecting and Locating Your Laundry Tubs

When you modernize your home with electricity and plumbing, you will want a permanent place with stationary laundry tubs for doing the laundry. This may be in the basement, in a special laundry or work room on the first floor, or in a separate wash house.

Your laundry tubs should be of a quality that fits with the rest of your equipment but decoration beyond simple neatness is of little consequence. The most common ones are made of cement composition although soapstone, concrete, enameled cast iron, and porcelain ones are available.

You will probably prefer a two compartment tub since it provides for two rinses.

In addition to being located so that it has proper drainage and hot and cold water faucets, you will want your tub placed so that the clothes can be put through the wringer of your electric washing machine directly into the rinse water.

Selecting and Locating Your Shower for Farm Workers

Most farms have need for a shower bath in the basement, in the woodshed or in the wash house where the farm workers can clean up without using the bathroom in the house. You may use a regular bathroom shower compartment for this purpose, but if you have a concrete floor, a drain placed in the floor with a shower head and a curtain rod with a curtain attached to the wall will make a satisfactory installation.

Selecting a Wash Basin for the Back Porch

If you put a sink or lavatory on the back porch, you will have a place to wash up as you come from your farm work without messing up the kitchen sink or the bathroom. You may have removed an old sink from the kitchen that would serve very well for this use. Or you may want to buy a lavatory especially for this purpose.

Selecting and Locating Your Electric Water Heater

The cost of operating your electric water heater will depend on your electric rate and the amount of hot water that you use, not on the size

of your heater. Be sure that you get one that is big enough to really meet your needs. Many city families find 30 gallon and 40 gallon heaters large enough but most farm families need larger ones - 80 gallons or more. A large heater will hold enough hot water for wash day and cleaning milk utensils as well as for the regular household needs of cooking and cleaning.

Be sure you check with your cooperative or power company officials before buying your water heater. Often special low electric rates are available if certain types of heaters are put in. In some cases, certain types of heaters are forbidden because of the way that they put electrical load on the power line.

There are probably several places in your house where the water heater can be placed. Select the one that will allow the shortest pipes from the heater to the faucets where hot water will be used most frequently. Each time that you use hot water, the pipes from your heater to the faucet will be heated and left full of hot water. The pipes and the water in them will cool before more hot water is used. This wasted heat is wasted electricity. If the hot water pipes are short where hot water is used most frequently, this loss will be least.

Complete electric storage heaters consist of an inner tank which contains the heating elements and the water, and a round or square outer casing. The space between is filled with insulation. There is a thermostat in the water to control each heating element. Some heaters have one heating element and one thermostat while others have two heating elements and two thermostats. Those with two heating elements and two thermostats are the most popular on farms and in some cases are required by the cooperative or power company.

You can expect your electric water heater to use about 250 kilowatt hours of electricity a month although this will vary considerably depending on the amount of hot water that you use.

Selecting and Locating Your Water Softener

Many farm families are accustomed to using hard well water for drinking and cooking and soft rain water for washing. They want to continue to have soft water for washing after their complete plumbing is installed.

Completely separate water systems may be installed for the well water and the cistern water, but if the well furnishes enough water it is often cheaper to discard the cistern and install a water softener in the well water system.

The most common water softeners are steel tanks filled with a special sand known as "zeolite" through which the water flows. Zeolite removes from the water the calcium and magnesium compounds which causes hardness. After a certain amount of water has been softened, the zeolite will not remove any more hardness and it is then necessary to place common salt in the softener and wash it slowly through the zeolite. This leaves the zeolite ready to soften water again.

There are several types of zeolite, each particularly suited to a certain type of water. Various other materials are sometimes used with the zeolite to remove iron and other undesirable materials from the water.

It will be best if you will have a sample of your water tested in a competent laboratory before buying your softener. Most of the manufacturers of softeners have such laboratories and will make the test free of charge. You can then buy a softener with the proper zeolite and other materials to fit your particular water. This test will also tell you the amount of hardness in your water so that you can get a softener that will not need regeneration oftener than every couple of weeks.

Hardness in water is commonly measured in grains per gallon. Most hard water will have from 5 to 50 grains per gallon. If your water has 25 grains of hardness per gallon and you use 100 gallons of soft water per day, you will need a softener that will remove 36,000 grains of hardness between regenerations if you regenerate your softener every two weeks.

You will want to arrange your water pipes so that only the water for those faucets where you want soft water will pass through the softener. Water for your water closet, for lawn and garden watering and other similar uses does not need to be softened. This will reduce the frequency of regenerating your softener.

There is no cost for the operation of your zeolite softener except for the small amount of salt required for the periodic regenerations.

Planning the Waste Disposal Piping in Your Home

Proper materials and proper installation of the waste disposal piping in your house are among the most important parts of your plumbing installation. Trouble-free use and good sanitation require that this piping be put in properly. What you need depends on the fixtures that you put in and the arrangement of your house.

Every fixture must waste through a trap so that sewer odors will not come back into your house.

Your kitchen sink and laundry tubs can drain into ordinary 4 inch field drain tile buried about 18 inches deep in your lawn.

Your bathroom fixtures should drain to a septic tank.

To waste disposal piping to your septic tank must be large enough to handle your bathroom wastes. It must be vented to the outside air at the top of the house to allow sewer gases to escape and to maintain atmospheric pressure throughout the piping. It may be necessary for you to provide branches from this main vent to various fixtures to prevent siphoning the water from the fixture traps.

Your house drain will end and your yard sewer begin about five feet outside of your house.

Planning Your Yard Sewer

Your yard sewer will connect your house drain with your septic tank. It will be made either of cast iron soil pipe or clay sewer tile. Any portion of it which passes under a driveway or any other place where it would be subject to mechanical damage should be of extra heavy cast iron soil pipe. It must be watertight to the septic tank.

Planning Your Septic Tank

Except in unusual situations, a septic tank with a drain tile disposal field is the most desirable means of disposing of bath room wastes. Be sure that you consult your local health officials before planning to use any other means such as a cesspool. Septic tanks with their disposal fields will probably give the most trouble-free service and are less likely to contaminate the wells in the community.

A septic tank is a closed watertight chamber in which the sewage remains long enough for most of the solid matter to decompose into liquids and gases. The gases escape through vents, through the soil of the disposal field, or through the house drain and main vent in the house. The bacteria which bring about this decomposition are anaerobic, that is, they live where there is no air. For this reason, it is necessary that the septic tank be so constructed that neigher the incoming or outgoing sewage agitate the contents enough to mix air with it. This is sometimes done by placing baffles in the tank so that the flow through the incoming and outgoing pipes does not stir up the main contents. It is accomplished in other tanks by having the incoming sewage deposited straight donward several inches below the surface of the contents and having the outgoing sewage taken straight upward from about 18 inches below the surface at the other end of the tank.

The smallest septic tank should have about 500 gallons capacity, and if the house has more than 2 bedrooms, 100 gallons capacity should be added for each additional bedroom. The depth of the liquid should be at least 4 feet, and the length of the tank should be between two and three times the width. In figuring the size of a septic tank it is necessary to remember that the sludge accumulation in the tank from a family of five will reduce the liquid capacity about 100 gallons per year, and that the amount of sewage entering the tank will probably be about 50 gallons per person per day. Most septic tank troubles are caused by small size of inadequate disposal fields.

Your septic tank may be made of concrete, tile, or steel. Some authorities estimate that the life of No. 12 guage steel tanks averages about 10 to 15 years. A well build concrete or tile tank can last indefinitely.

Your entire sewage system must be of watertight construction wherever there is danger of seepage reaching wells or cisterns. The distance which should separate all sewage seepage and you well will depend on local conditions, but in most cases should be at least 100 feet. It would be well for you to discuss this with your local health authorities.

Contrary to popular opinion, a septic tank does not make sewage fit to drink. It is merely a settling basin in which solids are decomposed. The effluent from a septic tank is still sewage. Purification takes place in the soil after the sewage has seeped from the disposal tile and has been acted on by aerobic soil organisms.

No "starter" or other material need be put in your septic tank to start its functioning. All of the organisms that are needed will be there naturally without any assistance on your part.

Planning the Disposal Field for Your Septic Tank

Unless you live in a very cold part of the country where the ground freezes to a depth of 5 or 6 feet, your septic tank disposal field should be made of 4-inch drain tile buried about 18 to 24 inches in the soil. If you live in one of these very cold areas, you should discuss your disposal field with your local health authorities or your County Agent to determine the most satisfactory system. You may find that it is better, under your cold conditions, to use a seepage pit instead of lines of seepage tile, or to place several feet of gravel under your seepage tile lines.

Many disposal fields consist of a single line of tile, but it is usually better practice to have the outlet of the septic tank fork at a distribution box into two or more branches. This will reduce the danger of the tile near the septic tank becoming clogged and the soil becoming water-logged while that farther away receives no sewage.

The tile lines in your disposal field should be spaced at least 6 feet apart. If you have plenty of room, a spacing about 10 feet apart would be better.

You should place a bed of gravel at least 6 inches deep and the full width of the trench under the disposal tile.

Since the rate at which the soil will absorb the sewage will depend on the width of the gravel bed under the tile, the amount of tile that you will need will depend on how wide you dig the trench. You will probably use a trench 18 to 24 inches wide at the bottom. The number of square feet of gravel needed in the bottom of the trench can best be determined by a percolation test, but in the smallest installation in the most porous soil it should be at least 150 feet. Here is a good percolation test:

1. Dig a hole exactly 1 foot square and to the depth of the proposed trenches.

2. Fill the hole with water to a depth of at least 6 inches.

3. Measure the depth of the water accurately and observe the time in minutes required for it to seep away completely.

4. Divide the number of minutes required by the depth in inches to find the average time required for the water to drop 1 inch.

5. Use the following table to find the number of square feet of gravel needed in the bottom of the trench for a 1 bedroom house.

Number of minutes required for the water to drop 1 inch	Number of square feet of gravel needed in the bottom of the trench for each bedroom
2 or less	50
3	60
4	70
5	80
10	100
15	125
30	180
60	240
Over 60	Special designs needed. Consult your local health authorities.

6. Multiply the number of square feet of gravel needed for 1 bedroom, as found from the table above, by the number of bedrooms in your house. This gives you the number of square feet of gravel that you need in the bottom of the trench under your disposal tile.

You should make no single line of disposal tile more than 100 feet long. Each line should have a slope between 2 and 6 inches per 100 feet of length.

Your lawn or your garden may be good locations for your septic tank disposal field.